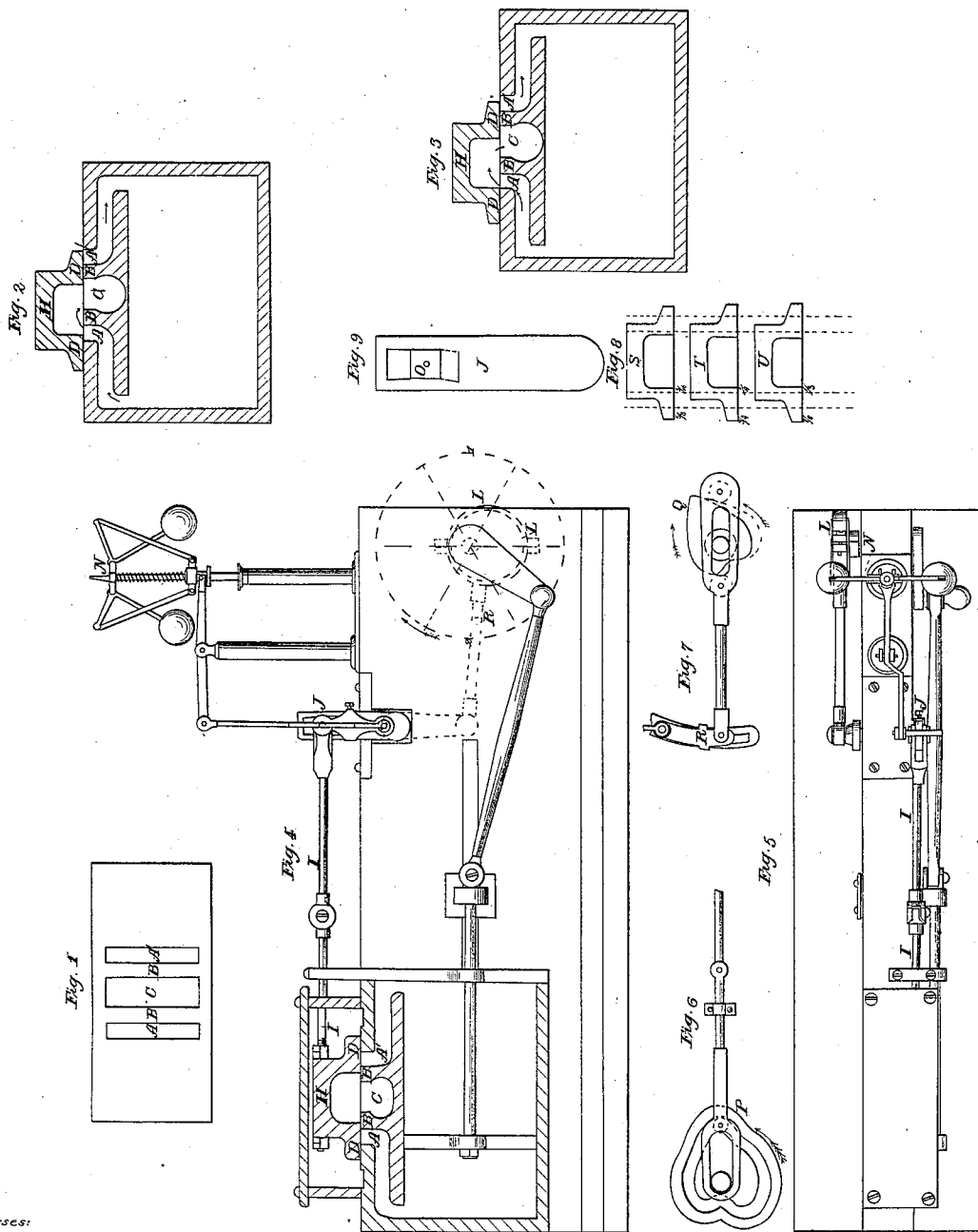


L Eikenberry,
Steam Cut-Off.

N^o 33,735.

Patented Nov. 19, 1861.



Witnesses:
A. J. Smith
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LEWIS EIKENBERRY, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STEAM SLIDE AND CUT-OFF VALVES.

Specification forming part of Letters Patent No. 33,735, dated November 19, 1861.

To all whom it may concern:

Be it known that I, LEWIS EIKENBERRY, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Combined Steam Slide and Cut-Off Valves; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan or top view of a steam-cylinder, showing the parts therein. Fig. 2 is a vertical longitudinal section of the same, showing the valve over the parts and in position for allowing a partial exhaust. Fig. 3 is a similar section showing the valve over the parts and in position to allow of a full exhaust. Fig. 4 is a longitudinal section of an engine complete, showing the valve in position for working the steam expansively. Fig. 5 is a plan view of the same. Figs. 6 and 7 show modifications of the mechanism for moving the valve. Fig. 8 is a diagram illustrating the mode of adapting the valve to the various wants of the engine. Fig. 9 is an enlarged detached view of the slotted rocking arm which controls the valve when arranged as shown in Fig. 3.

Similar letters of reference in each of the several figures indicate corresponding parts.

The leading idea of my invention is to adapt a slide-valve, whether arranged to work with a variable or invariable stroke, to the purposes of a cut-off and working steam expansively.

The nature of my invention consists in the combination of a slide-valve which is constructed with the width of the face of its jaws extended, as hereinafter described, with the mechanism which imparts motion to it and with the ports of the steam-cylinder, so that the steam shall be admitted at full pressure into the cylinder and cut-off at about one to three quarters of its movement without binding up the exhaust to an injurious extent on the opposite end of the cylinder, and then worked expansively during the balance of the effective part of the stroke without any detrimental loss of power from the exhaust or loss of power being experienced at that end of the cylinder at which the steam was last admitted during the forward movement of the piston.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A A' are the receiving and discharging ports, and C the exhaust-port, of a steam-engine cylinder.

B B are the bridges to give support to the valve in sliding back and forth. In a well-proportioned face of a steam-chest the bridges should be about the same width across as the receiving-ports A A', thereby providing a firm bearing for the valves, and the exhaust-port C should be about equal to both of the receiving-ports.

D D are the jaws of the valve H. They are extended in width, so as to cut off, when certain motions are imparted to the valve, the steam at any point which may be desired, say from one to three quarters of the stroke of the piston. The extending of the valve-jaws in this manner and working said extension or increased surface over the ports A, A', and C constitutes the gist of my invention. The valve is arranged on its seat and within a steam-chest in the ordinary manner, and it is operated when used simply for cutting off and working the steam expansively by means of a connecting-rod I, eccentric-rod K, and eccentric L, with or without the rock-arm J, substantially as represented.

In order to have the valve with extended jaws work the steam expansively, the eccentric must be so adjusted relatively to the main crank that the port A shall be slightly open or just on the eve of being opened. When the crank is at its dead-center 1 and the port A' in the same condition when the crank is at its opposite dead-center 2, and while the main crank is at either of the positions stated, that port which acts as the exhaust shall be open for about two-thirds of its width, and that when the crank gets beyond its dead-center 1 the size of the opening of the port A' shall be increased to about one-third of its width, and that of the port A shall be open its full width, and that during the remainder of the effective throw of the crank the port A' shall be closed and A kept open long enough for all practical purposes, and the steam behind the piston confined and worked expansively.

In order to have the valve with extended

jaws work as a governor-valve, I purpose to use a curved slotted rocking arm J, Fig. 9, and effect a connection between a governor N and the connecting-rod I by means of a slide O, which plays in the slot of the arm, as shown, or in any other approved manner. By this combination the point of cut-off and the speed of the engine will be regulated by the working-valve of the engine.

In order to have the valve with extended jaws work on its seat in a manner to keep the exhausting-port open during the whole stroke of the piston, I propose to substitute for the eccentric L devices P or Q, which are so shaped as to allow the valve to remain still during the latter portion of the effective stroke of the piston.

For the purpose of regulating the speed of the engine and varying the cut-off of the valve I propose, instead of raising and lowering the valve-rod, to have the eccentric-rod arranged to rise and fall, as represented at R in Fig. 7 of the drawings.

In order to have the valve to cut off at other points than those mentioned, the following proportioning of the jaws will be found of great service. I, however, do not intend to confine myself to these rules or proportions, as the same may be varied as circumstances may require.

In Fig. 8 I have shown samples of some of the best-proportioned valves for this purpose.

Valve S has its jaws extended outside of the ports five-eighths of the width of the port and three-sixteenths of the width of the port on the inside of the port or exhaust-chamber of the valve. It, however, may be varied from below zero to two-eighths in the exhaust. Valve T has its jaws extended six-eighths on its outside edge and two-eighths on the inside edge. It also can be varied. Valve U is extended on its outer edge seven-eighths and one-third or two-eighths in the exhaust, but may be varied from one-eighth to three-eighths in the exhaust. The valve represented in Fig. 4 has its jaws extended outside of the ports eight-eighths and one-third or two-eighths in the exhaust, but may be varied from one-eighth to three-eighths. It will be understood that the outer extending portion of the jaws can be varied, so as to have a greater or less length, as circumstances demand.

What I claim as my invention, and desire to secure by Letters Patent, is—

The within-described method of adjusting combined working and cut-off valves relatively to the ports of a steam-engine cylinder, in combination with the specified operation of the same, for the purpose set forth.

LEWIS EIKENBERRY.

Witnesses:

GOODWIN Y. ATLEE,
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